THE

Malayan Agricultural Journal.

Vol. XII. February, 1924. No. 2.

DECENTRALISATION.

IT is desired to draw attention to the advisability of Planters and others, who require the assistance of the Agricultural Department in any way, referring in the first instance to the local Assistant Agricultural Inspectors. Assistant Agricultural Inspectors are provided throughout the Federated Malay States and the Straits Settlements as follows :—

Station.	Area covered.
Butterworth ...	Penang and Province Wellesley.
Taiping (for Perak North) ...	Districts of Larut and Matang, Kuala Kangsar, Krian and Upper Perak.
Batu Gajah (for Perak South)	Districts of Kinta, Lower Perak and Batang Padang.
Kuala Lumpur ...	The State of Selangor.
Seremban ...	The State of Negri Sembilan.
*Raub (for Pahang West) ...	Districts of Kuala Lipis, Raub and Temerloh.
Pekan (for Pahang East) ...	Districts of Kuantan and Pekan.
Malacca ...	Settlement of Malacca.

As regards Singapore there is so far only a Sub-Inspector of Agriculture stationed there; he works directly under the Chief Agricultural Inspector at Kuala Lumpur, and the Chief Agricultural Inspector visits the settlement of Singapore from time to time. In 1925 however it is hoped to have an Assistant Agricultural Inspector stationed in Singapore.

* At the present time owing to shortage of Staff there is no Assistant Agricultural Inspector at Raub, and the Assistant Agricultural Inspector, Negri Sembilan is temporarily in charge of Pahang West also.

In some parts of the Peninsula Assistant Agricultural Inspectors have been provided only during the last few years, and it is probable therefore that the public are not sufficiently aware of the existence of these officers and of the purposes which they serve.

Very often enquiries are sent direct to the head office in Kuala Lumpur by persons who desire planting material or who require technical advice and assistance in connection with some pest or disease. In such cases reference should obviously be made first to the Assistant Agricultural Inspector for the locality concerned: this officer may be able to give immediately the assistance or information desired or at any rate he will be in a position to forward a communication to the appropriate technical officer at headquarters. It may be that a crop is attacked by some insect pest which he cannot identify; he will then arrange for a proper specimen packed in the right way to be sent to the Entomologist at Kuala Lumpur, ensuring at the same time that such assistance or advice as can be given will duly reach the enquirer. If however enquiries of this nature are sent direct to headquarters in Kuala Lumpur it is possible that insufficient information may be sent with them or that proper specimens may not be sent or that the specimens may not be properly packed; instances of this frequently occur, and indeed sometimes useless specimens reach the headquarters office at Kuala Lumpur without any accompanying letter or label so that it is impossible to say from whom or for what reason they were sent. Such cases occasion both delay and disappointment. A further serious disadvantage is that by such procedure the Assistant Agricultural Inspector is left in ignorance of a matter affecting agriculture in his particular territory of which he should properly be informed.

In this connection I would repeat again what I wrote in paragraph 71 of my Annual Report on agriculture for the F.M.S. in 1922 (published as supplement to the F.M.S. Government Gazette of October 5, 1923) as follows:—

> *Paragraph 71.*—"With the inauguration of the new system by which the Assistant Agricultural Inspectors in the various States and Settlements add certain lines of instruction work to their duties as Inspectors of plant pests and diseases, a notable departure has been made. It is hoped that in time all classes interested in agriculture will come to regard the local agricultural officers as their natural guides, councillors and friends in all agricultural matters; and that the local officers will serve as useful links between the research officers at headquarters in Kuala Lumpur and the planting community of all races throughout the country. As an aid to this end it is important that the Assistant Agricultural Inspectors keep in close touch with the District Officers, who are the interpreters of the people's needs and the pivot of the whole administration, and instructions have been given to the local agricultural officers to carry this out in practice.
>
> I feel sure that the better the officers of the Department and their work are known the more they will be used and appreciated."

In Johore the Inspector of Agriculture, Johore Bahru is the head of the State Department of Agriculture and as such all enquiries on agricultural subjects in that State should naturally be addressed to him. By arrangement between the respective Governments the services of the research officers of the Department of Agriculture, S.S. and F.M.S., have been made available in Johore, so that the Inspector of Agriculture can obtain their advice and assistance in technical matters, in the same manner as can the Assistant Agricultural Inspectors in the Colony or in the F.M.S.

To sum up, the public are requested to treat the Assistant Agricultural Inspectors as the local representatives of the Department of Agriculture, and as a general rule to get into communication with them before writing direct to the headquarters of the Department.

A. S. Haynes.

Kuala Lumpur,
1st February 1924.

SUMMARY OF THE WORK OF THE INSPECTION DIVISION FOR THE FIRST THREE QUARTERS OF 1923.

By F. W. South and F. Birkinshaw.

THE information given in this article is abstracted from the first three quarterly reports of the Chief Agricultural Inspector during 1923. It has been customary to publish these reports as they have been written, but, during the past year, space has not been available and three are, therefore, appearing together.

A.—Quarter January 1st to March 31st.

Estate Visits.

In all 131 Estates were visited; 14 were visited more than once and 31 by request of their Managers. This compares with 92 Estates visited during the last quarter of 1922. The objects of these visits were mainly in connection with disease control; a few were for the purpose of seeing new crops; while in Johore, four were visited at the request of the Secretary of the Rubber Restriction Committee.

Rubber Diseases and Pests.

Pink Disease, (*Corticium salmonicolor*).—There were new reports of this disease from 8 estates not previously infected. The disease was reported from two new localities in Penang Island during January, making a total of three small centres of infection in the Island. It was also reported for the first time in the neighbourhood of Sitiawan. As usual the disease became more prominent during spells of wet weather in the old infected areas. Routine measures for its control were maintained everywhere and enforced when necessary. The main difficulty in enforcing control is still that land owners will leave infected branches lying about after cutting them, instead of burning them immediately. Prolonged teaching by the Department's officers, even combined with regular prosecutions mainly for this fault, seem to be without effect.

Mouldy Rot (*Sphaeronema fimbriatum*).—This disease was newly reported from 1 Estate in Perak North, 4 Estates in Negri Sembilan and 1 in Johore.

In Perak North the disease spread to a new area of 20 acres adjoining the area formerly infected near Padang Rengas. This is a further instance to add to the already striking accumulation of evidence that the disease is conveyed about the country by human agency. Unfortunately it seems impossible to control the movements of wandering Chinese and Javanese tappers. Much of the area originally infected in Perak was free from the disease during this quarter and tapping was resumed on such previously infected holdings as had shewn no further signs of attack.

Generally speaking a spell of dry weather during this quarter effectively checked the disease in Selangor, Negri Sembilan, Pahang, Malacca and Johore.

In Selangor the only places infected were two small holdings at Sepang and one at Beranang. In the latter locality the disease was of recent occurrence and the land owner was to be prosecuted for failing to carry out the prescribed treatment fully. In Negri Sembilan it was difficult to find a single case of Mouldy Rot. More regular attention to treatment in addition to the dry weather were responsible for this.

In Malacca the disease appeared for the first time on 6 or 7 holdings in the Malaka Pindah neighbourhood, but was quickly got under control. The previously infected areas showed very few cases, but there is no doubt that wet weather conditions will bring back the disease, which should be particularly virulent in Sebatu and Sungei Rambai mukims. In these two mukims rubber is grown under conditions most favourable to the disease, on old padi land on which there is a thick undergrowth of bush and rubber seedlings. The fact that many owners are absentees adds to the difficulty of having such land effectively cleaned up.

In Johore the conditions in Muar were very bad during the early part of the quarter, more especially at Panchor where the Department had to carry out the work of treating a block of 25 small holdings under the supervision of the Special Field Officer. A total of 28 acres was thoroughly treated at a cost of $61. During January a bad outbreak occurred on a Chinese estate near Johore Bahru, nearly the whole area of 580 acres being affected. Control measures were immediately commenced and were successful.

Black Stripe Disease (*Phytophthora* sp.).—This was newly reported on 1 estate in Pahang West and on 3 in Negri Sembilan. Otherwise it calls for little comment.

Cyphella sp.—During wet weather in January reports were received from 5 or 6 estates in Selangor of damage caused to the renewing bark of certain trees by a fungus, sometimes mistaken for Mouldy Rot disease, but in reality quite different. This fungus appears as a flat, white, fan-shaped mycelium which frequently starts its growth at the angle of the tapping cut and vertical guiding channel, or in the corresponding angle at the top of the renewing bark. It spreads out over the surface of the renewing bark and slowly penetrates and kills it. Treatment by means of the usual mixtures of Agrisol and water, or brunolinum, tar and water will destroy it easily. Affected trees should not be tapped until they show no further signs of the fungus. The white mycelium is attributed to a species of the genus Cyphella, but its identity is doubtful, as fructifications have not yet been found. Isolated cases of this disease have occurred during several years past.

Coconut Diseases and Pests.

Beetles. (*Oryctes rhinoceros* and *Rhyncophorus schach.*)—The usual routine work on the control of these insects has been maintained

everywhere. In Penang and Province Wellesley good progress has been made, though much more work remains to be done to remove suitable breeding grounds. In the coast districts of Selangor the results have been disappointing in view of the work done; the Assistant Agricultural Inspector, Selangor, will, however, continue his efforts to increase the efficiency of the work. Much work is still needed in parts of Johore, where it is receiving regular attention. Casual accumulations of village refuse and cattle owner's manure heaps are two of the most prolific types of breeding grounds for the black, or rhinoceros, beetle and are the most difficult to get rid of effectively, since, when they have once been cleared up, they are promptly formed again, as soon as the inspecting officer's attention is temporarily removed to a different locality.

Brachartona catoxantha.—This serious pest of coconuts appeared at Permatang Pauh and Permatang Ara and also at Permatang To Jaya in Province Wellesley, at the first two places in February and at the last in March. A serious outbreak on the coconuts around Batu Gajah town was reported on February 22nd by the Assistant Agricultural Inspector, Perak South. In Selangor there was a small outbreak at Sabak Bernam, that by March had been almost overcome by natural controls, parasitic insects and a fungus (*Botrytis* sp.); a new outbreak occurred, however, about 1 mile away on a holding of about 10 acres in extent.

There was an attack on coconuts at Dong in Pahang West during January; by the end of the quarter the insects had entirely disappeared from this locality, but a new outbreak had started in a kampong about 200 yards to the South East.

It is peculiar that these attacks frequently occur in areas known to have been attacked in former years. This tends to indicate that the pest is always present in these localities, but is normally kept under control by its natural enemies. Outbreaks of the pest only occur when for some reason the natural enemies lose control; at present artificial measures of control consist of encouraging the renewed increase of the parasites of the pest. Any other measures on tall trees are impracticable or nearly so.

At Batu Gajah a certain area of tall trees was sprayed with water by the Ipoh fire brigade. Very large numbers of caterpillars were knocked off the trees and subsequently destroyed. This area was much freer from the pest in the next generation of caterpillars. Unfortunately a suitable water supply was not available for the fire engine through all the infected area round the town.

Nettle Caterpillars.—A minor pest recorded as doing some damage in Penang Island and in Selangor was *Thosea* sp.

White Flies.—Specimens of these were forwarded to the Entomologist from Province Wellesley. Other specimens, probably the same insect, were found on coconuts at Batu Gajah and elsewhere.

Padi Diseases and Pests.

Stem borers.—Both the Assistant Agricultural Inspector, Penang and Province Wellesley, and local Malays were of the opinion that there were a far greater number of these pests present in Province Wellesley during the recent padi season than there were in the previous season. Unfortunately it was impossible to ascertain which species had been responsible for the damage observed.

The Assistant Agricultural Inspector also recorded a statement made by several local growers that the bird known in Malay as Ruak-ruak exercises an important control over these pests. This statement seems to be sufficiently well supported to be worthy of further investigation.

Rats.—As usual reports of damage by these pests were received from various places where padi was ripening or being harvested during the quarter.

A further stock of ½ ton of barium carbonate was received and was distributed at cost price as required. A supply of ½ ton for use in the Colony only was ordered, together with 5 gross of rat traps; both poison and traps will be sold at cost price in the coming padi season.

Lalang and Blukar.

From all parts of the Colony and of the Federated Malay States reports were received that many Asiatic owners of rubber holdings had been making efforts recently to clear their land of lalang and blukar, as a reasonable profit was again obtainable on rubber.

As the owners' former plea of poverty no longer held good, action was to be taken by Inspecting Officers, and was to be strictly enforced, to ensure that dirty holdings should be cleaned up during the coming quarters of the year.

The success of Giant Mimosa, *Mimosa invisa*, in eradicating lalang was proving somewhat doubtful. In several instances it was observed that, after from one and a half to two years of vigorous and successful growth, this plant fruited heavily and then died out. The prompt reappearance of patches of lalang in such areas proved that the cover crop had not been present long enough to kill out all the roots of the grass. The cause of the death of the Mimosa is not clearly understood as yet. Possibly the cover would renew itself after some months; this remains to be tested.

The Assistant Agricultural Inspector, Selangor, stated that in coastal regions observations during 1922 indicated that the common passion-flower will overcome lalang in about a year. The use of the passion-flower for this purpose on inland areas is doubtful; general experience would show that it is not safe to rely on it to kill lalang.

Water Hyacinth.

Apart from routine work to remove such patches of this weed as were found, a special gang worked on the Perak River around Bandar under the supervision of the Assistant Agricultural Inspector, Perak South.

Pests and Diseases of Other Crops.

Mistletoe, (*Loranthus* spp.) Dalu api or Daun api api (M).—The species of this plant are pests in various parts of the country and appear to be growing more plentiful. Fruit trees in native holdings are frequently attacked, as are kapok trees; while rubber trees not infrequently harbour this pest and occasionally suffer considerable damage. It is distributed by the agency of birds. Action was being taken to have it removed and burnt when found. Where advice is disregarded such action is enforced, as the plant is a pest under the definition in the Agricultural Pests Enactment.

Acatina fulica.—The Giant snails were slowly diminishing in numbers at Butterworth. At the other infected locality in the Province, they were reported to be multiplying slowly and spreading. Advice was given as to the measures to be adopted for their control.

Die-back of Cloves.—Attention was drawn to this in the Annual Report of the Chief Agricultural Inspector for 1922. (Malayan Agricultural Journal Vol. XI, No. 10, p. 253.) It is commonly associated with the presence of one or more borers in the branches of the trees. Considerable damage is done to the older trees on Penang Island and on Bukit Mertajam and the disease might be worth investigating.

Notes on General Agriculture.

Rubber.—Generally speaking a fairly definite spell of dry weather everywhere during the quarter caused the "wintering" of this crop to be very regular, though leaf-fall was earlier in some localities than in others.

The improvement in the price of rubber resulted in the reopening of tapping on the majority of small holdings. Occasionally, however, especially where the full output allowed is not easily obtained, small holders continued to sell their coupons at about 35 cents per kati and to leave their trees untapped.

The Young Producers Restriction Committee, on which the Chief Agricultural Inspector served, reported at the end of February.

Coconuts.—The price of copra rose during the quarter to the neighbourhood of $10/- per picul.

The dessicated coconut factory in Province Wellesley, referred to in the Annual Report of the Chief Agricultural Inspector 1922, published in the Malayan Agricultural Journal Vol. XI, No. 10, p. 256, appeared to be already a profitable enterprise.

Padi.—The harvest was nearly completed in most parts of the Peninsula, except in Malacca, during the quarter. A summary of it will appear in the Annual Report of the Chief Agricultural Inspector for 1923 and in consequence will not be given here.

An additional area of land was acquired for the Malacca padi experiment station at Klebang Besar, making the total area 16 acres. Repairs to the dam were completed and arrangements were in progress to obtain an access road and a site for the store, and thus to complete the whole station in readiness for the next season.

A cultivation experiment was started and plots of different green dressings were sown.

The Assistant Agricultural Inspector, Selangor, stated that arrangements were proceeding for enlarging the padi area in Bagan Nakhoda Umar, so that this mukim should eventually have the largest padi area in Selangor. He called attention to the importance of planting selected pure line strains of padi on this new area from the very beginning.

The Assistant Agricultural Inspector, Negri Sembilan, stated that surveys were being carried out in Rembau and Kuala Pilah with a view to constructing permanent, in the place of several temporary, dams.

Experiments to determine if suitable green manures will improve old bendangs and also to improve mining slimes for padi cultivation were in progress in Perak North.

Fruit.—The Assistant Agricultural Inspector, Penang and Province Wellesley, remarked that fruits in season were plentiful in the markets and reasonable in price. In other parts of the country the fruit crop early in the quarter varied considerably from one locality to another; in certain places durians, rambutans and pulasans were plentiful.

The orchard of fruit trees imported from Australia and planted on an estate near Batu Gajah was reported to be doing well and should give useful information in the future. The Assistant Agricultural Inspector, Perak South, tried to pursuade owners of land in certain Malay Reservations to plant up a few marcotted fruit trees, such as Chiku and Limes, obtained from the grower at Telok Anson. The Malays, however, considered the price of $1/- per plant more than they could afford.

Roselle.—Small quantities of seed were distributed in Province Wellesley and in Negri Sembilan. The Assistant Agricultural Inspector, Perak South, was growing a small quantity of this plant to provide seed in two new Malay Reservations.

Tapioca.—The Assistant Agricultural Inspector, Selangor, stated that a tapioca mill was erected on an area of land planted with this crop in Kuala Selangor district, and that the cultivation of this crop

appeared to have been successful. This is believed to be the only tapioca mill in Selangor.

Instructional Work.

Padi Demonstration.—Early in March the Economic Botanist gave a very useful demonstration of the selected strains of padi at the Titi Serong Experiment Station in Kriaa. This was attended by Penghulus and other Malays; all the officers of the Inspection Division who were able also attended. The Assistant Agricultural Inspector, Perak North and the Junior Agricultural Assistant, Taiping, assisted the Economic Botanist. The Assistant Agricultural Inspector, Perak North, remarked that the Malays who attended the demonstration appeared to grasp something of the methods of selection and the good results to be expected therefrom. He considered that the demonstration had done much to awaken keenness to give the selected padis a fair test.

Roselle.—The roselle demonstration plots at Kota Bahru and Malim Nawar in Perak South were doing well; one at Sungei Raya was only fair, but might improve; while the fourth at Gopeng was a failure, probably because the soil was too sandy and became too dry.

A demonstration of stripping roselle for retting was given by the Assistant Agricultural Inspector, Selangor, at the demonstration plot at Batang Kali on March 16th. This plot has not been a real success for reasons which are not quite clear. The plot at Tanjong Malim was a complete failure, probably owing to unsuitable soil and lack of cultivation. New plots were planted in January and February, one at Kapar and two at Klang; these shewed signs of much greater success, provided they obtained sufficient rain.

Show.—A very successful Agri-Horticultural Show, at which the Assistant Agricultural Inspector, Negri Sembilan, assisted and the Chief Agricultural Inspector acted as a judge, was held in Seremban on March 24th. The number of exhibits was so large that they were considerably crowded in the limited space. This was particularly noticeable in the fruit and vegetable sections. Malays appear to be taking an increasing interest in these shows.

B.—Quarter April 1st to June 30th.

Staff Changes.

Mr. South, Chief Agricultural Inspector, left for home on leave on May 19th, Mr. F. Birkinshaw was appointed to act for him during his absence.

Inche Mohamed Noor, a Senior Agricultural Assistant, was appointed to act as Assistant Agricultural Inspector, Perak North, to replace Mr. Birkinshaw. Inche Mohamed Zin bin Haji Yusope was appointed an Apprentice in the Department for the Straits Settlements and assumed duty in Malacca on June 12th.

Estate Visits.

Altogether 73 estates were visited by the Inspection Staff of which 33 were visited by request of the Managers or Agents. Thirteen were visited more than once. The majority of these visits were in connection with pest and disease control. They also include four visits made in Johore by request of the Rubber Restriction Committee.

Diseases and Pests of Rubber.

Pink Disease (*Corticium salmonicolor*).—This disease was newly reported from 4 estates in Selangor, 2 in Negri Sembilan, one in Pahang West and from one in Johore, making 8 new reports in all.

No further reports of the presence of the disease have been received from Sitiawan. In Selangor a new, but not heavily, infected area was found at Ulu Klang, while badly infected small areas are still being found in Ulu Selangor and are receiving attention. Routine control measures are being maintained everywhere and call for no special comment.

A branch of Gardenia attacked by Pink Disease was forwarded by the Acting Assistant Agricultural Inspector, Perak North, for verification.

Mouldy Rot. (*Sphaeronema fimbriatum*).—Part of the infected area in Perak North is still giving much trouble. The disease is being well controlled in the parts where the best control work was instituted when the disease was first discovered, but in the part of the area which is the least accessible the position is not satisfactory. Supervision of this latter area is rendered difficult because of its distance from any main road and the cultivators are very difficult people to deal with. An attempt will be made to come to some arrangement whereby rubber coupons will be refused to the small holders who do not follow instructions given them.

No fresh reports have been received of any appearance of this disease outside the area previously affected.

In Selangor a little Mouldy Rot is still to be found at Sepang. It is receiving attention. At the end of the quarter it was reported that no signs of the disease could be found in Ulu Langat.

The position in Negri Sembilan is still satisfactory in that the number of cases found in holdings has been very few. Dry weather partly accounts for this, but it is also due to some extent to the fact that small holders are beginning to realise the seriousness of the disease and the real need for control measures.

In Malacca a good deal of trouble was experienced with small holders in the area at Sungei Rambai, Sebatu and Batu Gajah, who showed great reluctance to carry out instructions for control of the disease. During the last fortnight in June a concentrated effort was made in these areas to try and affect an improvement. A Notice

Server has been given temporary inspection powers under the Ordinance for these areas. The co-operation of the District Officer has been obtained. It is hoped that the infliction of heavier fines, the stoppage of coupons to holders who do not carry out treatment and the temporary appointment of an inspecting officer especially for the localities concerned will all combine to effect an improvement in the control of the disease.

The Inspector of Agriculture, Johore, reports that Muar district still remains the centre of the heaviest infection, especially at Panchor and Gresek. An improvement in the conditions in Batu Pahat is reported.

Black Stripe. (*Phytophthora* sp.).—A few cases of this disease have been reported from Ulu Langat in Selangor and from Seremban and Batang Benar in Negri Sembilan. It is still in evidence at Jelebu and Pertang. In Johore a report of Mouldy Rot from one estate proved on investigation to be Black Stripe.

Fomes lignosus.—The Inspector of Agriculture, Johore, reports:—

"Lack of treatment in the early stages has given this disease a firm hold on many properties and its efficient treatment at the present juncture presents great difficulties." A statement of this kind emphasises the importance of thoroughly treating at the outset the scattered infected patches to be found in the majority of young clearings throughout the country.

Mistletoe.—In March last a firm of Estate Agents approached the Department on the question of the possibility of various species of local mistletoe, known as Dalu Api or Api-Api, becoming wide-spread on Rubber estates and doing considerable damage to the trees. It was mentioned that these local mistletoes were giving much trouble on certain estates, more especially in Malacca. Reports on this subject have now been received from all Assistant Agricultural Inspectors and the position appears to be that various species of mistletoe are present everywhere, growing mainly on fruit trees. In only a very few cases were these parasites found to any extent on rubber. Removal of mistletoe from cultivated trees is now being enforced and this policy will be continued.

No other pest or disease of rubber calls for special mention this quarter.

Pests and Diseases of Coconuts.

Beetles. (*Oryctes rhinoceros* and *Rhyncophorus schach.*)—In Perak South ravages by the Black Beetle increased in certain localities in the Kinta District. New mining lands have been opened in the neighbourhood and coconut trees thereon have been killed or cut down, thus forming good breeding places for the pest. The grubs were also found in cattle manure in the compounds of Bengali owners. A concentrated effort has been made to get all the coconut stumps and trunks and the manure heaps cleared up, and good progress in this respect had been made at the end of the quarter.

The Black Beetle is still doing much damage in the coastal districts of Selangor although recent prosecutions for not clearing up manure heaps appear to have had a little effect on some of the cattle owners of the neighbourhood.

In Johore in the Batu Pahat and Cucob districts the Red Stripe Weevil is doing damage. In these districts there are large areas of the sago palm and the refuse left about after removal of the sago affords breeding places for the pest. The inaccessibility of these districts makes control of the pest a difficult matter.

Brachartona catoxantha.—In Perak North small outbreaks of this pest occurred in the Krian District at Sungei Kota and Sungei Megat Aris. The pest did little damage and at the end of the quarter the attack had died out as a result of heavy parasitisation in which the fungus *Botrytis* sp. played an important part. These localities suffered from attacks in April 1921.

In Selangor the pest is reported from Sepang. There have been attacks in former years here also.

In the two localities in Province Wellesley the pest is now heavily parasitised, especially by the fungus.

In Perak South the attack in the vicinity of Batu Gajah is now over. Here insect parasites appear to have been the main factor in control. Altogether about 100 acres were affected and the attack lasted through 4 generations of the pest.

In Pahang West the attack at Dong is over, as is also the attack reported last quarter in Kuala Selangor district.

Lalang and Blukar.

During the quarter a good deal of attention has been given by the whole of the Inspection Staff to the clearing up of dirty holdings, in accordance with the change of policy on this question as outlined in the last quarter's report. It is bound to be a long while before any great improvement will be generally apparent, but gradual progress is reported by most of the Assistant Agricultural Inspectors. In small holdings the eradication of lalang is an object very difficult of attainment and progress is bound to be slow.

Dirty kampongs are specially a danger in Mouldy Rot areas as thick vegetation between the rubber trees prevents free movement of the air. In the stagnant damp atmosphere which obtains this disease is very persistent and difficult to control. Concentrated and continuous efforts are being made to bring such holdings into a better condition of sanitation, and the clearing up of lalang and blukar in Mouldy Rot areas is looked upon as an important item in the control work of that disease.

Water Hyacinth.

During this quarter, as in the last, the Perak North Gang has still been engaged upon clearing up areas near Taiping. The clearing

of the weed from an old mining land area accounts for the gang's more than usually prolonged stay in the vicinity of Taiping. At the end of the quarter arrangements were being made to send the gang for the annual clear up of the Sungei Perak between Kuala Kangsar and Bota. In Perak South the swamp at Malim Nawar again received attention.

Pests and Diseases of Other Crops.

Mango Branch Borer. (*Rhytidodera simulans*, White.)—During the quarter an examination of the Mango trees in Krian showed that this pest is prevalent through the whole district. Attempts to control its ravages are being made.

Notes on General Agriculture.

Padi.—A progress report on the results up to date of the distribution of pure strain seed has been prepared and published in the Malayan Agricultural Journal Vol. XI, No. 11, p. 335. The records obtained so far emphasise the need for a definite scheme of distribution with careful, continuous and systematic control. The work so far done has provided much useful information indicating what strains are likely to be the most suitable for various localities. There are also indications that the pure strains, after being grown a few years in a fresh locality are likely to give better results than when first introduced.

Cultivators in all parts of the country are now showing more interest in the pure strains than before, as is evidenced by the applications for seed being greater than in the previous year. This is an encouraging result of the time spent by the Staff last season in making the superiority of the pure strains known to cultivators and the demonstration given by the Economic Botanist and Assistant Agricultural Inspectors at Titi Serong in March.

In many districts, including Perak, planting will be late again on account of the continuance of dry weather.

The test stations at Talang in Perak and at Permatang To Jaya in Province Wellesley are being planted this season under the same arrangement as for the last season.

The Experiment and Test Station in Malacca has been the scene of busy operations. At the end of the quarter nearly the whole area had been ploughed, a Cletrac tractor being used for the purpose. Harrowing will follow.

The Assistant Agricultural Inspector, Negri Sembilan, reports that one concrete dam with wooden divisions has been built at Rembau and it is hoped that a second will be completed and in readiness for the coming season.

Fruits.—The mango season in Krian shows promise of being a good one.

A heavy crop of durians is expected in Upper Perak and Kuala Kangsar districts of Perak and in the Rembau and Kuala Pilah districts of Negri Sembilan.

The Agricultural Inspector, Johore, reports that the area under pineapples in Johore is increasing rapidly. Fruit has been plentiful throughout the quarter and prices have fallen to $1/- per hundred.

Roselle.—In Selangor a demonstration of stripping and retting was given at Kapar early in June.

In Perak South the demonstration plots at Kota Bahru and Malim Nawar have been cut and retting was in progress at the end of the quarter. A crop of ground nuts is being planted in each case as a rotation before the next planting of Roselle.

Patchouli.—The Inspector of Agriculture, Johore, reports as follows :—"Some little interest has recently been evinced in the cultivation of Patchouli and slightly over 100 acres are under cultivation at present. A small distillation plant has been established near Johore Bahru. The price obtained for the oil is at present from seven to nine dollars per pound."

Instructional.

An Agri-Horticultural Show was held in Kuala Lumpur from June 30th to July 2nd inclusive and was well attended. The Assistant Agricultural Inspector, Selangor, as Secretary for the Agricultural Section, put in a lot of hard work and succeeded in organising in a creditable manner a very difficult Section.

Many insect specimens for this show were collected by the Inspection Staff in outstations.

A show was also held in Pekan on June 16th but no details are yet available regarding it.

In Pahang East a series of lectures on pruning fruit trees and other subjects of general agricultural interest were given by the Assistant Agricultural Inspector.

General.

The Inspector of Agriculture, Johore, on behalf of the Secretary for Rubber Restriction, examined a further number of estates.

C.—Quarter July 1st to September 30th.

Staff Changes.

On August 13th Mr. Nock, Acting Assistant Agricultural Inspector, Pahang West, proceeded to England on leave.

Certain changes among the staff of Malay officers were made in order to allow Apprentices in training to attend the second part of the Lecture Course.

On July 12th Inche Ismail bin Haji Salleh and on August 1st Inche Osman bin Hitam were appointed Federated Malay States Malay Apprentices in the Department.

On September 8th Inche Mohd. Saikh, Malay Apprentice, Bagan Datoh, was transferred to Titi Serong Experiment Station to undergo a course of training with a view to his possible appointment next year as Padi Inspector, Perak. Inche Alang, Acting Sub-Inspector of Coconuts, Krian, is being similarly trained with the same object.

Estate Visits.

During the quarter 40 estates were visited including 5 by the Acting Chief Agricultural Inspector. Of these 16 were by request of Owners or Managers and 6 were visited more than once. The majority of these visits were made in connection with diseases of rubber, a few in response to requests for advice regarding other crops and two, in Johore, by request of the Rubber Restriction Committee.

Diseases and Pests of Rubber.

Pink Disease (*Corticium salmonicolor*).—This disease was newly reported from 2 estates in Perak North, 3 in Selangor and 2 in Negri Sembilan making a total of 7 newly reported estates.

In Kuala Kangsar District, Perak North, it has been impossible to spare as much time to enforce control of this disease as one could wish, owing to the necessity to concentrate on the control of Mouldy Rot. Consequently in some localities the disease is not receiving all the attention it should from some small holders. An effort will be made to pay more attention to the control of "Pink" so soon as the Sub-Inspector of the District can be released for a while from the mouldy rot area, which takes up the whole of his time for the present.

In Batang Padang and Lower Perak Districts less difficulty than formerly is being experienced in getting small holders properly to treat this disease. In many instances verbal instructions are all that is required to ensure measures being taken and the formal issuing of notices under the Enactment can be dispensed with.

In Selangor the Assistant Agricultural Inspector reports that this disease appears to be far less in evidence than at any time in his experience. This applies more particularly to Ulu Selangor. An arrangement whereby the District Planters' Association of Ulu Langat agreed to report to the Assistant Agricultural Inspector all cases where heavily attacked holdings were noticed by those employed on restriction work, is working satisfactorily. This method of co-operation between District Planters' Associations and the Inspection Division might be extended with advantage to all concerned.

Mouldy Rot. (*Sphaeronema fimbriatum*).—In Perak North, so far as can be ascertained, this disease is still confined to the area previously infected. A determined effort is being made to improve matters in the more inaccessible portion of the area where conditions

were reported to be far from satisfactory last quarter. Three Malay small holders who had stubbornly refrained from carrying out control measures in a satisfactory manner, were prosecuted and fined $15/- each. Even fines, however, do not in many cases attain the result desired in the case of Mouldy Rot, where control measures include the cessation of tapping for a period. It is satisfactory, therefore, to be able to report that the District Officer has agreed to co-operate by withholding the issue of rubber coupons to the worst offenders, until we certify that satisfactory control measures have been taken. During the quarter coupons have been withheld from 32 persons and the latest reports indicate that this method of dealing with the problem is likely to prove successful.

In Selangor this disease has been newly notified from one estate in Kuala Langat. But for this the position remains unchanged.

This disease is newly notified from one estate in Negri Sembilan. Otherwise the position is the same as reported last quarter. During this quarter 5 convictions for failure to treat were obtained.

In Malacca the position is still far from satisfactory. The disease has now spread to the mukims of Machap, Serkam, Kemuning and Tampoi, of which Machap is the worst infected. No improvement can be reported in the position in the mukims of Sungei Rambai, Sebatu, Batu Gajah and Merlimau. This is extremely disappointing after the amount of effort put in by the Inspection Staff in these areas and the hopes entertained last quarter that at last some effective action would be taken towards enforcing proper control measures. The difficulties are (*a*) the great number of absentee land owners with a Chinese tapper only as occupier of the land (*b*) the amount of lalang and blukar in holdings which keeps the air in a stagnant and damp condition very favourable to the growth and spread of the disease (*c*) a general failure to realise the gravity of the situation and the fact that control measures carried out in a slipshod fashion are as bad as no control measures whatever. I hope in the near future to make a personal investigation of the position in Malacca and to be able to report better progress next quarter.

In the Muar District of Johore this disease was virulent notwithstanding a long spell of dry weather. The infected lands here are coastal and low lying, which is doubtless the reason why dry weather does not serve as a check to the disease. The position in Muar generally appears to be very similar to that in Malacca.

In Segamat District a spell of dry weather during the earlier part of the quarter exercised a distinct check upon the disease, but owing to a succession of heavy afternoon rains in September, the disease had increased at the end of the quarter.

In Batu Pahat the disease persists in small localised patches on the coastal lands.

Small sporadic outbreaks in Johore Bahru have been kept under strict supervision which has prevented any further spread.

Black Stripe (*Phytophthora* sp.).—In Negri Sembilan this disease still persists at Jelebu and Pertang. No further cases have been seen at Pantai during the quarter. The disease is newly reported from one estate in this State.

Fomes pseudo-ferreus.—The Inspector of Agriculture, Johore, reports that this disease has taken a heavy toll of trees on two estates in the State.

Pests and Diseases of Coconuts.

Beetles. (*Oryctes rhinoceros* and *Rhyncophorus schach*).—Reports from Perak South show that much progress has been made during the quarter in getting rid of the breeding grounds of both these insects in the District of Kinta. The Mining Companies have made considerable strides in destroying dead coconut trees on their lands and in and around Lahat a thorough inspection of the manure in cattle sheds has resulted in the discovery and treatment of many black beetle breeding grounds.

An increase of these pests around Port Swettenham led the Assistant Agricultural Inspector, Selangor, to visit the locality in September. Breeding grounds of the black beetle were found in the shape of decaying grass and manure hidden by cut grass. These have received attention.

In Kuala Selangor the black beetle is still much in evidence and, unfortunately, is likely to remain so. It breeds in heaps of cattle manure which is used regularly in the locality as a top-dressing for Sireh plantations. The problem of enforcing the treatment of the manure is difficult, as in many instances, an order for the removal of a heap results in its being carried away and hidden in undergrowth on adjoining State Land. All that is possible is being done to restrict the numbers of this pest.

In Province Wellesley the routine work of getting rid of decaying coconut stumps is being steadily continued.

Brachartona catoxantha.—The Assistant Agricultural Inspector, Perak South, reports that the coconuts at Batu Gajah, which were very badly defoliated, are gradually recovering their normal appearance. The attack at Sepang, reported last quarter, only affected a small area and the pest has now disappeared.

In Province Wellesley the attack at Permatangs Pauh and Ara affected a much larger area than the earlier attack at Permatang To' Jaya. In the former case an area of about 2 miles in length by from 100 to 200 yards in width suffered. As stated in the last report the fungus parasite, *Botrytis* sp., is now effectively controlling the pest.

Thosea sp.—In Perak North this pest was found doing slight damage to a small isolated area of Coconuts.

Pests and Diseases of Padi.

Leptocorisa sp.—The Padi fly or "pianggang" has appeared in quantity in two localities in Negri Sembilan, namely Johol and Simpang Inas.

Nymphula depunctalis.—This pest has been responsible for a certain amount of damage to padi nurseries at Pekan Darat and Permatang To' Jaya in Province Wellesley.

Lalang and Blukar.

From most parts of the country reports to hand indicate that there is a certain amount of improvement observable in respect of the condition of small holdings, though such improvement is of necessity slow. The Inspector of Agriculture, Johore, has given much attention to this matter and he reports progress, but adds that it will be necessary to maintain a vigorous campaign as the work done is usually very superficial.

Water Hyacinth.

The annual clearing up of the Sungei Perak between Kuala Kangsar and Bota by the Water Hyacinth gang in Perak North was commenced on August 3rd and was completed on September 29th.

Pests and Diseases of Other Crops.

The Assistant Agricultural Inspector, Province Wellesley and Penang, reports that borers are doing considerable damage to some of the Nutmeg and Clove plantations in Penang. This matter will receive further attention.

Collections are being made of species of Loranthus for examination by the Economic Botanist for identification and with the object of investigating their distribution, both geographically and from the point of view of favourite host plants. Work so far done indicates that rubber may only be attacked to any great extent by one or two species. The practical value such work may have in determining the best measures for the control of the pest is obvious.

Several minor pests and diseases of plants of small economic importance have been received from various parts of the country for identification by the Government Entomologist and Mycologist and for advice as to treatment.

General Agriculture.

Rubber.—As indicated under the heading "Lalang and Blukar" there is a noticeable improvement in the sanitation of Rubber lands throughout the country. This applies more especially to small estates and Chinese owned properties and small holdings. During the quarter under review it does not apply generally to Malay holdings, as owners of such are occupied with padi planting.

The Inspector of Agriculture, Johore, sums up the situation in that State as follows :—" The steady and somewhat favourable condition of the rubber market has induced many companies to put into operation schemes for the general improvement of their properties. Activities in such matters as white-ant control, clearings of jungle stumps and timber, drainage, soil conservation and improved treatment of disease have been noted." He adds, however, that the small holders in Johore show no inclination voluntarily to improve their holdings.

The Assistant Agricultural Inspector, Province Wellesley, reports that during August and September much damage was done to low-lying rubber plantations in the North District by severe wind storms which felled many thousands of trees.

Coconuts.—The dessicated coconut factory at Bagan Ajam, mentioned in the first report of the year, is still running satisfactorily.

Padi.—Everywhere, including Krian, this crop is exceptionally late owing to late rains. In many parts the date of actual planting is a month and even six weeks behind the scheduled date. The planting in an area in Bagan Tiang, Krian, was made even later than it would otherwise have been by a heavy flood which washed away young plants in the nurseries and necessitated re-sowing. The Sanglop Valley area in Kinta is being planted again this year. This valley runs from Gopeng to Kota Bahru and was formerly used as a deposit for slimes from Gopeng Mines. Unfortunately the area is subject to floods and it is, therefore, decided to raise its level by further sliming to commence immediately after next years crop has been harvested. To minimise the danger of floods for this season and to afford a better control of water, a channel has been cut through the area. The growing of padi on this slimed land is of interest in view of the amount of dredged, slimed land which will later on be available for agricultural purposes.

Roselle.—This crop is still being grown successfully by two estates, the one in Perak and the other in Negri Sembilan.

Fruit.—The fruit season was a good one in most localities.

Tapioca.—In the first quarterly report for this year mention was made of the alienation of land at Bukit Kapar for this crop. During the past quarter enquiries have been received from Kedah and Penang regarding the advisability of alienating other areas for this crop.

Instructional.

(1) Padi Experiment Stations under this Division.

(*a*) Malacca.—The total area of this Experiment Station is 23 acres. Much of this area has been fallow for some years and was evergrown with low scrub, lalang and rushes. Its thorough cultivation by means of tractor was commenced last quarter and completed during this quarter. Even after being twice ploughed and harrowed three

times, some of the area was not in the condition expected: such parts, after flooding, were given a further ploughing and harrowing with native implements. Eighteen acres have been planted with padi this season. The dam was put in order before planting, but it is still far from satisfactory and leaked so badly after it had been in use for a few days that, had it not been for heavy rain at a convenient time it is probable that much of the planted padi would have been damaged, as it was last year. The dam has been repaired once more and will be further tested.

(*b*) Manurial experiment station at Pekan Darat in Province Wellesley. Ten acres of land has been secured on a six years lease and is being planted up throughout with one pure strain. No manuring has been done this season, as it is intended to find out first to what extent the soil varies in different parts of the station.

(2) *Padi Test Stations.*—In Perak North Talang bendang is again being utilised. Arrangements are being made to start a test station on similar lines in the Kenas Irrigation area. Land for this station has been promised and it is intended to settle about half a dozen Krian cultivators thereon and to have the area cleared ready for the establishment of the test station next season.

In Province Wellesley a test station is again being laid down at Permatang To' Jaya.

(3) *Distribution of pure strains.*—This season approximately 1,300 gantangs of pure strains padi has been distributed through this Division.

(4) *Demonstration Plots.*—Roselle. In Selangor the plots have not attained the object aimed at, namely, the establishment of Roselle as a small holders crop in the localaties concerned. Notwithstanding that the people at Kapar were shown how to ret the fibre and the owner of the ¼ acre plot was informed that his fibre, similarly rettted, could be sold for $11/- to 12/- a pikul, he made no attempt to harvest the remainder of the crop. No greater interest was shown in any of the localities where plots were laid down in Selangor.

At two localities in Perak South the outlook appears to be more promising, namely at Kota Bahru and Malim Nawar. Here the owners of the plots expressed themselves as pleased with results obtained and are keen to continue growing roselle. At the present moment the plots are in groundnuts as a rotation.

Yields.—Jalan Raja plot yielded at the rate of 2,360 lbs.

Kota Bahru at 1,900 lbs. and Malim Nawar at 1,600 lbs. per acre.

(5) *Lectures.*—The Assistant Agricultural Inspector, Perak South, delivered a lecture to the Penghulus of Kinta on the Black Beetle and Red Stripe Weevil, explaining their life histories and application of the control measures.

General.

Experiments with Greendressings on slimed dredged lands. At both Kamunting and Kota (Perak North) *Mimosa invisa* and *Tephrosia candida* give promise of being the most satisfactory plants so far tried for the purpose required. In both cases *Crotolaria striata* and *Tephrosia purpurea* have grown well, but these plants appear to be too small to provide the heavy dressing required, unless they are capable of maintaining a continuous cover under the conditions present by means of self sown seed *Cajanus indicus* has made slow growth in both instances and appears to be unsuitable for the type of soil. *Sesbania aculeata* has also proved unsatisfactory. Trials are being made with *Crotolaria usaramoesis*, which is a bigger plant than *Crotrloaria striata*, and with an undetermined species of Tephrosia which has grown well at Serdang.

Similar trials have been laid down on slimed dredged land near Batu Gajah.

Received for publication 24th January 1924.

PROGRESS REPORT ON THE EXPERIMENTAL PLANTATION, SERDANG, FOR THE QUARTER ENDING 31st DECEMBER, 1923.

By B. Bunting.

FURTHER progress was made in the opening up of the Experimental Plantation, Serdang and the clean clearing of the newly-opened 175 acre block was practically completed at the end of the quarter, the clean clearing of an area of about 25 acres of the block, situated on the lowest point, having to be held over until it could be drained. Arrangements have been made to drain this area and the work of clean clearing will be proceeded with immediatedly the draining operations are finished.

A start was made on the ploughing of this area by tractor and good progress should be made with this work during the next quarter.

Planting of Crops.

A number of small areas were planted up with different crops during the quarter, including a 10 acre block of varieties of coffee, but the area available for planting was somewhat limited and until the opening up of the 175 acre block is more or less completed further planting operations will necessarily be held up.

A large number of miscellaneous trees were planted up in the aboretum during the quarter.

Pests and Diseases.

Insect pests have proved very troublesome on the planted areas and, in a large number of cases, spraying operations have been carried out on the recommendation of the Government Entomologist.

New Planting Materials.

The following material was received during the quarter under review :—

Palmyra Palm.—Seeds of this palm were received from the Department of Agriculture, Ceylon, and planted in the sand-beds in the nursery.

Cocoa.—Seeds of the Nicaragua variety of Cocoa were also received from the Department of Agriculture, Ceylon, but germination was very bad and so far only seven seedlings have been obtained.

Pili Nut.—A parcel of 50 seeds of the Pili nut (*Canarium ovatum*) was received from the Bureau of Agriculture, Manila and up to date about 11 have germinated.

Tuba Root.—Three varieties of *Derris* (tuba) have been received from the Botanic Gardens, Singapore and established in the nursery. Cuttings of two varieties named Tuba Gajah and Tuba Rimba were also received from Kuala Lumpur, but have not yet struck.

African Oil Palm.—A further supply of seeds were received from the Experimental Plantation, Kuala Lumpur and have been used for germination tests. Seed soaked in water at a temperature of 150C commenced to germinate after 19 days from the time they were put in to soak, or 42 days after planting, whilst seeds planted out without any treatment commenced to germinate at 51 days after planting.

Brazil Nuts.—About 60 fruits of the Brazil Nut were received from the Experimental Plantation, Kuala Lumpur and on an average contained 16 seeds each. These were planted in specially prepared seed beds.

Bay Tree.—A supply of seeds of the Bay tree were received from Montserrat, British West Indies, but have not yet commenced to germinate.

Mulberries.—About 40 cuttings were received from the Government Plantation, Sapintas and planted in pots in the nursery. The majority of the cuttings appear to have been established. A further 6 large plants in boxes were received from the Experimental Plantation, Kuala Lumpur.

Hemp Varieties.—A number of young plants of *Furcraea guantea* and *F. cubensis* were received from the Arghan Co., Telok Anson and are doing well.

Pita Fibre. A small supply of Pita suckers were obtained from a Rubber Estate in the Kuala Selangor district for experimental purposes and are now well established.

Pineapples.—About 20 suckers were received from the Government Plantation, Teluk Anson and are all growing well in the nursery.

Papaya.—About 100 seeds of a variety of papaya, that originally came from the Transvaal, were received from the Manager, Government Plantation, Sapintas. Some of the seeds have germinated and it is hoped to raise a few plants for stock purposes.

Candle Nut.—A parcel of 750 seeds of *Aleurites montana* were received from the Superintendent, Botanical & Forestry Department, Hong Kong and have been planted in boxes in the propagating shed. So far the seeds have not germinated.

Lime Tree.—About 1½ lbs. of seeds of the West Indian Lime tree were received from Montserrat, British West Indies and planted in boxes.

Sweet Potatoes.—Three tubers of each of the following varieties of the sweet potato were also received from Montserrat :—Southern Queen, Victoria and North. They are all growing well in a small nursery bed,

Algaroba Bean.—A small quantity of seed of this flowering tree was received from the Experiment Station, Honolulu and a good percentage germination was obtained.

Kapok.—A number of rooted stumps were received from the Experimental Plantation, Kuala Lumpur and used for supplying.

Coffee.— A further supply of seed of varieties of coffee were obtained from the Experimental Plantation, Batu Tiga, but so far these have not germinated.

Nutmegs.—About 250 seeds were obtained from Balik Pulau, Penang for supplying purposes. Germination has not yet commenced.

Cola Nut.—A good supply of Cola Nut seed was received from Grenada, British West Indies and was planted in boxes. These seeds have shown fair germination and the young seedlings appear to be doing well.

Roads and Buildings.

The extension of the road through the planted area was continued and the surface of the portion between the Limes and the Croton blocks was covered with laterite. Additional drains were put under the new road where required in order to deal with storm water, which was washing away the surface in places.

A commencement was made on levelling the main road through the centre of the plantation and it is expected that the work will be nearly completed during the ensuing quarter.

The P.W.D. started work on the new entrance road to the plantation at the beginning of the quarter and excellent progress has been made in the construction of this road, which will be ready for use about March next.

New drains have been cut in the blocks planted with Kapok and Limes in order to drain the low-lying places in both these areas.

The following new buildings have been erected in the plantation during the quarter :—

1 Set of Cooly Lines (20 rooms)
1 Kitchen for do (5 „)
1 General Store with Office
1 Petrol & Oil Store (corrugated iron)
1 Cattle shed (3 stalls & 2 rooms)

Work on levelling up the factory site was continued and, with the aid of Decauville track on loan from the railway, good progress has been made on this work during the quarter.

General.

A number of plants were added to the herbarium during the quarter and further additions will be made as material becomes available.

Regular weekly visits of inspection were made during the period under review.

Numerous visitors were shown round the experimental plantation during the quarter. The Advisory Committee visited the plantation on the 29th October and inspected the work in progress. The Chief Secretary (the Hon'ble Mr. W. George Maxwell, C.M.G.,) accompanied by the Secretary for Agriculture (Mr. A. S. Haynes) also paid an official visit on the 5th December and made a general tour of inspection of the opened area.

Received for publication 4th February, 1924.

THE SOYA BEAN (GLYCINE HISPIDA).

By F. G. Spring.

A large quantity of Soya beans is consumed in the Peninsula, particularly by the Chinese. The bean is a native of China and Japan where it has been cultivated for food from time immemorial. It is also a favourite food amongst Tamils but is used to a smaller extent by them. In China it is a staple food of the country and to a good extent takes the place of rice there. The importance of growing such a valuable food in this country cannot be over estimated especially when one considers the large Chinese population. In most tropical countries dried beans are produced on a big scale but in Malaya the inhabitants have to depend to a very large extent on outside sources of supply.

The Soya bean has been experimented with from time to time in the Peninsula with varying degrees of success and it was considered that good returns could not be obtained here unless a particular type was imported or a variety acclimatized to local conditions.

On the instructions of the Secretary for Agriculture who had obtained information from the Hon'ble Mr. Choo Kia Peng a visit was recently made by the writer to Manchis, Pahang, as it was reported that the bean was being cultivated in that neighbourhood. It was found that upwards of thirty Chinese small holders are growing this crop, each to an extent of around one acre. The land is flat and undulating and the soil a rich friable clay. The majority of the plots have been under cultivation for five years and are now in a fine state of tilth.

The beans are grown as a catch crop amongst rubber until the shade from the trees is too great for the legume to thrive satisfactorily when it is then grown as a sole crop in rotation with rice, groundnuts and sweet potato.

The original source of seed was from China, but whether the good results obtained are due to this particular seed having become acclimatized or to its being a special variety suited to local conditions is difficult to say ; the question of soil may also be an important factor. The Department of Agriculture, S.S. & F.M.S. has experimented with seed purchased in the local market but the crops were not satisfactory and tests are now to be made with seed which has been obtained from Manchis.

The method of cultivation adopted by the Chinese is as follows :— The soil is changkolled to a depth of four inches and the seed dibbled in at distances of 18 inches apart, two seeds at each position a few inches apart. The seed is placed about one inch below the surface of the ground. Previous to sowing, all weeds are removed from the land and two subsequent weedings are done at intervals of one month. The

crop is ready-for harvesting in about three months from the time of planting. The green matter is a valuable manure and is incorporated in the soil. The seed is separated from the pods by hand beating which is not a difficult process provided the pods have been well sun dried. The seed is thoroughly sun dried before being stored. It was difficult to ascertain the yield per acre but one of the small holders estimated a return of 40 katis of dried beans for each kati planted. The best yields are obtained when planting is done in the wet season but at such a time that the crop is harvested during dry weather.

The crops were not subject to insect pests or fungus diseases but a certain amount of damage was experienced by the pods beings attacked by birds. If the crop was grown on a larger area the loss in beans, per acre, would be very much less.

There are several varieties of Soya beans, one common type yielding yellow seeds and another black, the former is the more popular as a food and it is this one which is grown by the Chinese at Manchis. The Soya bean is a small erect annual plant growing to a height of about two feet but this varies considerably according to the class of soil in which they are grown. The plant produces a good amount of shade over the ground but not sufficient to render weeding unnecessary, the growth of weeds is, however, retarded to some extent.

The Chinese are fully aware of the value of a rotation of crops and by this means, and good cultivation they have been able to maintain equally good returns annually over a period of years. A suitable rotation is a cereal crop followed by a pulse and then a root crop and this is the system adhered to by the small holders of Manchis.

The Soya beans are consumed mostly by the growers themselves but any surplus stock is sold in Bentong or Kuala Pilah where there is a ready market for the produce which fetches from 6 to 9 cents a kati. The purchase price in the Kuala Lumpur market is 9 cents a kati.

The beans are eaten in a number of ways but are generally boiled and eaten alone or in conjunction with rice or other foodstuffs. They are also pounded into flour and made into cakes. In India the beans are eaten in the form of "dhal".

The inhabitants around Manchis are almost entirely self supporting as regards food and it is to be hoped that the growing of the soya bean may be taken up in other districts. The Department of Agriculture has several addresses of Chinese cultivators and any prospective grower desiring a supply of Soya beans, for planting purposes, should communicate with the Agriculturist.

The bean is known by the Chinese as " *Wong Tau* " (Cantonese) which means the yellow bean, in Hakka as Vong Theu and in Hokkien Ui^{n} Tau.

Note.—In amplification of the above article a note has been received from the District Officer, Bentong, stating that the Soya Bean

is grown not only at Manchis but also nine miles from Bentong on the road to Kuala Lumpur. The Chinese there are said to plant it in freshly cleared ground, not to manure it or cultivate the ground in any way ; and the bean is said to grow easily. Hakka vegetable gardeners in Raub are also said to grow the Soya bean freely, interplanted with other crops.

At Bentong there is a bean curd factory in an attap shed behind the town where the bean curd (or *Tau Fu* in Cantonese) is made for sale in the local market.

A.S.H.

Received for publication 17th January, 1924.

NOTES ON THE EXPERIMENTAL PLANTATION, SERDANG FOR THE MONTH OF JANUARY, 1924.

THE plantation is situated about 3 miles from Serdang in the State of Selangor and is roughly 150 feet above mean sea level.

The total area is approximately 1525 acres, 625 acres of which have been opened up and the balance of 900 acres kept in reserve.

New planting material received during the month included two varieties of Soya Bean (*Glycine hispida*) from Pahang, 25 varieties of Yams (3 varieties of *Discorea Esculenta*) and 22 varieties of *D. alata* from the Botanic Gardens, Singapore and three plants each of 4 varieties of Tea (*Camellia Thea*) from Kenny Estate, Jeram, Selangor.

Rain fell on 18 days during the month giving a total rainfall of 4.66 inches. The heaviest rainfall in 24 hours was .93 inches.

The maximum shade temperature recorded was 94°F and the minimum 64°F. The average maximum shade temperature was 90. 45°F and the average minimum 69. 74°F.

A cup-indicating anemometer was installed on the plantation and readings of the run of the wind were taken as from the beginning of the month. The total run of the wind for the month was 1212. 3 miles, the average run for the 12 hours from 6 a. m. to 6 p. m. being 30. 74 miles and that from 6 p. m. to 6 a. m. 8. 37 miles.

Visit of His Highness The Sultan of Selangor.

H. H. The Sultan of Selangor, accompanied by Tengku Alam Shah (Tengku Panglima Raja, A.D.C.), Mr. A. S. Haynes (Secretary for Agriculture), Mr. B. Bunting (Agriculturist in Charge of Government Experimental Plantations), and other officers of the Department of Agriculture; with Mr. de Moubray (Collector of Land Revenue, Kuala Lumpur), visited the Government Experimental Plantation, Serdang on Wednesday January 16th 1924.

His Highness, with Tengku Alam Shah and Mr. Haynes left Kuala Lumpur about 8 a.m. by car, and arrived at the plantation, which is situated fourteen miles south of Kuala Lumpur beyond Sungei Besi, at about 9 o'clock. He was received by the various officials, the Penghulus of the Kuala Lumpur District, and about fifty Malay subjects of His Highness.

After signing the visitors book, His Highness and the party proceeded to the Seed Store, and thence to the nurseries which cover an area of ten acres. A tour of the nurseries was made, the features and uses of the different crops being explained. His Highness shewed a

great desire to see everything, and made many practical comments drawn from his intimate knowledge of local agricultural practice and crops.

Proceeding by car, His Highness then visited the highest hill on the plantation, from whence an excellent panoramic view of the opened area was obtained. Afterwards, he walked through the plantation, inspecting the field blocks of such crops as kapok, roselle, areca nut, limes, Mauritius hemp, bananas, pineapples, and the Chaulmoogra plant, from which is obtained the oil now used in the cure of leprosy.

At the conclusion, His Highness expressed his pleasure in visiting the plantation ; and proceeded on the return journey to Kuala Lumpur at 11 o'clock.

The Penghulus and other Malays followed the progress round the plantation with great interest, many of them being anxious to procure planting material of crops which especially appealed to them as being suitable for planting on a small scale.

Received for publication 11th February, 1924.

A USEFUL PLANT FOR INDIA.

By K. Kunhikannan.

Reprinted from the Agricultural Journal of India, Vol. XVIII, Pt. II.

WHILE engaged in research work at the Standford University, California I had to look up references regarding a tree commonly known as Mesquite or Algaroba and was so impressed with its usefulness that I decided to take seeds with me to India. The tree is a native of Brazil but is either indigenous or cultivated in Argentine, Chile, Peru, Bolivia, Columbia, Central America, Mexico, Texas and the West Indies.

In Hawaii, where I had opportunities of observing the habits of the tree, it was introduced by a missionary in 1828. Since then it has spread over the islands, and now occupies in Oahu alone no less than 100,000 acres. The tree is, however, confined to the leeward portions of the island where it thrives from the sea coast up to an altitude of 2,000 feet. In this part of the island rainfall is scanty and in places so little that the localities may be little different from semi-arid desert. The windward side of the islands have, however, a different climate owing to the trade winds which blow practically throughout the year. Rainfall varies from 200 to 400 inches. Here the tree is but rarely found.

The Mesquite is a legume belonging to the Genus Prosopis which is represented by but two species in India. The following is the scientific description of the plant *Prosopis juliflora* :—

> "A tree 10 to 20 M. tall, branches glabrous or minutely puberulous ; stipules small setaceous, or aristate, sometimes obsolete ; spines axillary, solitary or in pairs, straight, in sterile branches up to 5 cm. long, devaricate, sometimes very short or entirely absent ; leaves glabrous or rarely pubescent, distant or in short branchlets, subfasciculate, common petiole 12 to 50 mm. ; glands often small between the pinnae, and smaller between leaflets ; pinnae often 1-jugate, rarely 2-jugate, very rarely 3-jugate ; rachis 3.25 to 7.5 cm. ; leaflets broadly oblong 4 to 6 mm. long, or linear 12 mm. to 2.5 cm. long, with intermediate forms straight or falcate, obtuse or pointed, the costa somewhat prominent beneath ; inflorescence spicate, axillary or fascicate with the leaves, shortly pedunculate, 5 to 10 cm. long, dense or slender and subinterrupted ; bracts minute, flowers glabrous outside or with few short scattered hairs, 3 mm. long, calyx 1 mm, long, the opening often ciliate, petals are often woolly inside at the apex, ; stamens half as long again as the corolla ; ovary shortly stipilate, villose : pod more or less arcuate or nearly straight, 5 to 15 cm. long, 4 to 12 mm. wide, before maturity often flat compressed, at maturity on both sides more or less convex, continuous outside, or between the seeds marked with depressions of transverse lines, mesocarp more or less spongiose, endocarp hard, often horny,"

The tree is very variable. In Texas it is little more than a shrub but further south in Mexico it grows into a large tree often attaining a height of 45 to 50 feet with a diameter of about 2 feet. The roots go down to great depths after water. This latter feature makes it specially adapted for growth in regions with scanty rainfall.

The flowers have a sweet scent and the flower spikes are from 4 inches to 6 inches long. There are two flowering seasons, one in April and the other about October. The pods are from 6 to 10 inches long and have a thick spongy pericarp containing syrupy matter. They turn yellow when ripe and drop to the ground. They are of high nutritive value and much relished by all kinds of stocks. Children in Texas also eat them. The pods are collected and ground to serve better as cattle food. The crop in the islands of Oahu alone is estimated at 25,000 tons annually and a factory has been established there to deal with this enormous output.

The value of the tree does not consist in the pod alone. The long flower spikes yield honey in abundance and in some parts of Texas and Hawaii this is the only source of honey for the large number of beehives kept. They produce an abundance of pollen. Out of the 600 tons of honey produced in Hawaii about 200 tons are derived from mesquite alone. A tree of about 30 feet spread is estimated to produce 2½ pounds of honey. One advantage the tree has over most other honey-producing trees is that it blossoms twice in the year, once about April and again in October. The April blossoms last till August so that save for a short period of about two months there are flowers nearly the whole year. A fairly continuous supply of honey is assured to bees. A second feature is that, provided there has been rain in the latter part of the year, there will be an abundance of flowers the next year no matter how dry the following summer is.

When grown to its full height the Mesquite is a very graceful tree and serves well as an ornamental tree in parks. The wood takes on fine polish and is therefore used for furniture and cabinet work.

From the description given above, the value of the tree to India is obvious. Provided it can be naturalized—and there can be no doubt from the wide range of its habitat that it can be—it will go far to solve the problem of cattle famine. The large yield of pods averaging to 200-250-300 lbs. will provide a source of highly nutritive food especially in localities where from want of rain the cattle are liable to starvation. The adaptability to semi-arid regions makes it specially valuable. There are large tracts in India of this description where the tree may usefully replace other trees now growing wild or grown solely for firewood.

The Mesquite is equally important as a source of honey. One great obstacle to extensive bee-keeping in India is the scarcity of honey-yielding plants in the plains.

As a result indigeneous bee-keeping has been confined to the hilly tracts where the drawback does not exist. With the introduction of the Mesquite there will be provided a continuous source of honey for the greater part of the year.

A large number of seedlings have been raised in Bangalore from the seeds brought down from Hawaii.* They seem to thrive well but their behaviour in their new home is yet too early to forecast. The tree is very variable as has been mentioned already. It is possible that it will exhibit the same variation in India as it has in other parts of the world. But whatever the variation, its great value as a source of highly nutritive cattle food is not likely to be diminished under the different conditions of this country.—

Note.—Since the acceptance of the article for the Journal (Agricultural Journal of India), I have been informed by Rao Bahadur Rangachari, Lecturing Botanist at the Agricultural College, Coimbatore, that he saw several of these trees fairly full grown in a sandy tract near Madras and the appearance showed that they were thriving well. The possibility has occurred to me, therefore, of the introduction of the plant in other localities in India, more especially in parks and botanical gardens. If my surmise is correct, there is already valuable experience available of the behaviour of the tree under Indian conditions, and I trust those who have it will make it known to the public through the medium of this Journal. (K. K.)

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* A small supply of seed of this plant has been obtained by this Department from the Hawaii Experiment Station, Honolulu for planting at the Experimental Plantation, Serdang. The germination of the seed was good and about 600 seedlings have been raised from the small quantity of seed supplied.

From the information available at present the plant appears to thrive best in the dry regions and it will be interesting to see whether it is possible to establish it under the moist conditions prevailing in Malaya. In order to test the tree under different conditions in this country it is intended to distribute the seedlings as widely as possible throughout the Peninsula and any one interested in its cultivation should apply to the Department of Agriculture, Kuala Lumpur, for seedlings without delay, otherwise arrangements will be made to dispose of the limited amount of stock now available for distribution.

B.B. (4-2-24).